

SEQUENCE LISTING

<110> Crooke et al.

<120> ANTISENSE MODULATION OF APOLIPOPROTEIN B EXPRESSION

<130> 30566/39662

<150> US 60/426,234

<151> 2002-11-13

<150> PCT/US03/15493

<151> 2003-05-13

<160> 892

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<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (129) .. (13820)

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Met Asp Pro Pro Arg Pro Ala Leu Leu Ala Leu Leu Ala Leu  
1 5 10

cct gcg ctg ctg ctg ctg ggc gcc agg gcc gaa gag gaa 218  
Pro Ala Leu Leu Leu Leu Ala Gly Ala Arg Ala Glu Glu Glu  
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atg ctg gaa aat gtc agc ctg gtc tgt cca aaa gat gcg acc cga ttc 266  
Met Leu Glu Asn Val Ser Leu Val Cys Pro Lys Asp Ala Thr Arg Phe  
35 40 45

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gga gtc cct ggg act gct gat tca aga agt gcc acc agg atc aac tgc Gly Val Pro Gly Thr Ala Asp Ser Arg Ser Ala Thr Arg Ile Asn Cys 65 70 75	362
aag gtt gag ctg gag gtt ccc cag ctc tgc agc ttc atc ctg aag acc Lys Val Glu Leu Glu Val Pro Gln Leu Cys Ser Phe Ile Leu Lys Thr 80 85 90	410
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gcc ttg ctg aag aaa acc aag aac tct gag gag ttt gct gca gcc atg Ala Leu Leu Lys Lys Thr Lys Asn Ser Glu Glu Phe Ala Ala Ala Met 115 120 125	506
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Thr	Lys	Lys	Met	Gly	Leu	Ala	Phe	Glu	Ser	Thr	Lys	Ser	Thr	Ser	Pro	
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Pro	Lys	Gln	Ala	Glu	Ala	Val	Leu	Lys	Thr	Leu	Gln	Glu	Leu	Lys	Lys	
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Val	Gln	Cys	Gly	Gln	Pro	Gln	Cys	Ser	Thr	His	Ile	Leu	Gln	Trp	Leu	
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gtg	gcc	ctg	atc	ccc	gag	ccc	tca	gca	cag	cag	ctg	cga	gag	atc	ttc	1418
Val	Ala	Leu	Ile	Pro	Glu	Pro	Ser	Ala	Gln	Gln	Leu	Arg	Glu	Ile	Phe	
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Asn	Met	Ala	Arg	Asp	Gln	Arg	Ser	Arg	Ala	Thr	Leu	Tyr	Ala	Leu	Ser	
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Ser Glu Ile Leu Ala His Trp Ser Pro Ala Lys Leu Leu Leu Gln Met			
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Trp His Tyr Asp Glu Glu Lys Ile Glu Phe Glu Trp Asn Thr Gly Thr			
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1280

1285

1290

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gtg gct ggt aac cta aaa gga gcc tac caa aat aat gaa ata aaa cac Val Ala Gly Asn Leu Lys Gly Ala Tyr Gln Asn Asn Glu Ile Lys His 1825				5642
1830				1835
atc tat gcc atc tct tct gct gcc tta tca gca agc tat aaa gca gac Ile Tyr Ala Ile Ser Ser Ala Ala Leu Ser Ala Ser Tyr Lys Ala Asp 1840				5690
1845				1850
act gtt gct aag gtt cag ggt gtg gag ttt agc cat cg <sup>g</sup> ctc aac aca Thr Val Ala Lys Val Gln Gly Val Glu Phe Ser His Arg Leu Asn Thr 1855				5738
1860				1865
				1870
gac atc gct ggg ctg gct tca gcc att gac atg agc aca aac tat aat Asp Ile Ala Gly Leu Ala Ser Ala Ile Asp Met Ser Thr Asn Tyr Asn 1875				5786
1880				1885
tca gac tca ctg cat ttc agc aat gtc ttc cgt tct gta atg gcc ccg Ser Asp Ser Leu His Phe Ser Asn Val Phe Arg Ser Val Met Ala Pro 1890				5834
1895				1900
ttt acc atg acc atc gat gca cat aca aat ggc aat ggg aaa ctc gct Phe Thr Met Thr Ile Asp Ala His Thr Asn Gly Asn Gly Lys Leu Ala 1905				5882
1910				1915
ctc tgg gga gaa cat act ggg cag ctg tat agc aaa ttc ctg ttg aaa Leu Trp Gly Glu His Thr Gly Gln Leu Tyr Ser Lys Phe Leu Leu Lys 1920				5930
1925				1930
gca gaa cct ctg gca ttt act ttc tct cat gat tac aaa ggc tcc aca Ala Glu Pro Leu Ala Phe Thr Phe Ser His Asp Tyr Lys Gly Ser Thr 1935				5978
1940				1945
				1950
agt cat cat ctc gtg tct agg aaa agc atc agt gca gct ctt gaa cac Ser His His Leu Val Ser Arg Lys Ser Ile Ser Ala Ala Leu Glu His 1955				6026
1960				1965
aaa gtc agt gcc ctg ctt act cca gct gag cag aca ggc acc tgg aaa Lys Val Ser Ala Leu Leu Thr Pro Ala Glu Gln Thr Gly Thr Trp Lys 1970				6074
1975				1980
ctc aag acc caa ttt aac aac aat gaa tac agc cag gac ttg gat gct Leu Lys Thr Gln Phe Asn Asn Glu Tyr Ser Gln Asp Leu Asp Ala 1985				6122
1990				1995
tac aac act aaa gat aaa att ggc gtg gag ctt act gga cga act ctg Tyr Asn Thr Lys Asp Lys Ile Gly Val Glu Leu Thr Gly Arg Thr Leu 2000				6170
2005				2010
gct gac cta act cta gac tcc cca att aaa gtg cca ctt tta ctc Ala Asp Leu Thr Leu Leu Asp Ser Pro Ile Lys Val Pro Leu Leu Leu 2015				6218
2020				2025
				2030
agt gag ccc atc aat atc att gat gct tta gag atg aga gat gcc gtt				6266

Ser	Glu	Pro	Ile	Asn	Ile	Ile	Asp	Ala	Leu	Glu	Met	Arg	Asp	Ala	Val	
																2045
																2035
																2040
gag	aag	ccc	caa	gaa	ttt	aca	att	gtt	gct	ttt	gta	aag	tat	gat	aaa	6314
Glu	Lys	Pro	Gln	Glu	Phe	Thr	Ile	Val	Ala	Phe	Val	Lys	Tyr	Asp	Lys	
																2050
																2055
																2060
aac	caa	gat	gtt	cac	tcc	att	aac	ctc	cca	ttt	ttt	gag	acc	ttg	caa	6362
Asn	Gln	Asp	Val	His	Ser	Ile	Asn	Leu	Pro	Phe	Phe	Glu	Thr	Leu	Gln	
																2065
																2070
																2075
gaa	tat	ttt	gag	agg	aat	cga	caa	acc	att	ata	gtt	gta	gtg	gaa	aac	6410
Glu	Tyr	Phe	Glu	Arg	Asn	Arg	Gln	Thr	Ile	Ile	Val	Val	Val	Glu	Asn	
																2080
																2085
																2090
gta	cag	aga	aac	ctg	aag	cac	atc	aat	att	gat	caa	ttt	gta	aga	aaa	6458
Val	Gln	Arg	Asn	Leu	Lys	His	Ile	Asn	Ile	Asp	Gln	Phe	Val	Arg	Lys	
																2095
																2100
																2105
																2110
tac	aga	gca	gcc	ctg	gga	aaa	ctc	cca	cag	caa	gct	aat	gat	tat	ctg	6506
Tyr	Arg	Ala	Ala	Leu	Gly	Lys	Leu	Pro	Gln	Gln	Ala	Asn	Asp	Tyr	Leu	
																2115
																2120
																2125
aat	tca	tcc	aat	tgg	gag	aga	caa	gtt	tca	cat	gcc	aag	gag	aaa	ctg	6554
Asn	Ser	Phe	Asn	Trp	Glu	Arg	Gln	Val	Ser	His	Ala	Lys	Glu	Lys	Leu	
																2130
																2135
																2140
act	gct	ctc	aca	aaa	aag	tat	aga	att	aca	gaa	aat	gat	ata	caa	att	6602
Thr	Ala	Leu	Thr	Lys	Lys	Tyr	Arg	Ile	Thr	Glu	Asn	Asp	Ile	Gln	Ile	
																2145
																2150
																2155
gca	tta	gat	gat	gcc	aaa	atc	aac	ttt	aat	gaa	aaa	cta	tct	caa	ctg	6650
Ala	Leu	Asp	Asp	Ala	Lys	Ile	Asn	Phe	Asn	Glu	Lys	Leu	Ser	Gln	Leu	
																2160
																2165
																2170
cag	aca	tat	atg	ata	caa	ttt	gat	cag	tat	att	aaa	gat	agt	tat	gat	6698
Gln	Thr	Tyr	Met	Ile	Gln	Phe	Asp	Gln	Tyr	Ile	Lys	Asp	Ser	Tyr	Asp	
																2175
																2180
																2185
																2190
tta	cat	gat	ttg	aaa	ata	gct	att	gct	aat	att	att	gat	gaa	atc	att	6746
Leu	His	Asp	Leu	Lys	Ile	Ala	Ile	Ala	Asn	Ile	Ile	Asp	Glu	Ile	Ile	
																2195
																2200
																2205
gaa	aaa	tta	aaa	agt	ctt	gat	gag	cac	tat	cat	atc	cgt	gta	aat	tta	6794
Glu	Lys	Leu	Lys	Ser	Leu	Asp	Glu	His	Tyr	His	Ile	Arg	Val	Asn	Leu	
																2210
																2215
																2220
gta	aaa	aca	atc	cat	gat	cta	cat	ttg	ttt	att	gaa	aat	att	gat	ttt	6842
Val	Lys	Thr	Ile	His	Asp	Leu	His	Leu	Phe	Ile	Glu	Asn	Ile	Asp	Phe	
																2225
																2230
																2235
aac	aaa	agt	gga	agt	agt	act	gca	tcc	tgg	att	caa	aat	gtg	gat	act	6890
Asn	Lys	Ser	Gly	Ser	Ser	Thr	Ala	Ser	Trp	Ile	Gln	Asn	Val	Asp	Thr	
																2240
																2245
																2250
aag	tac	caa	atc	aga	atc	cag	ata	caa	gaa	aaa	ctg	cag	cag	ctt	aag	6938
Lys	Tyr	Gln	Ile	Arg	Ile	Gln	Ile	Gln	Glu	Lys	Leu	Gln	Gln	Leu	Lys	
																2255
																2260
																2265
																2270
aga	cac	ata	cag	aat	ata	gac	atc	cag	cac	cta	gct	gga	aag	tta	aaa	6986
Arg	His	Ile	Gln	Asn	Ile	Asp	Ile	Gln	His	Leu	Ala	Gly	Leu	Lys		
																2275
																2280
																2285

caa cac att gag gct att gat gtt aga gtg ctt tta gat caa ttg gga Gln His Ile Glu Ala Ile Asp Val Arg Val Leu Leu Asp Gln Leu Gly	7034
2290 2295 2300	
act aca att tca ttt gaa aga ata aat gat gtt ctt gag cat gtc aaa Thr Thr Ile Ser Phe Glu Arg Ile Asn Asp Val Leu Glu His Val Lys	7082
2305 2310 2315	
cac ttt gtt ata aat ctt att ggg gat ttt gaa gta gct gag aaa atc His Phe Val Ile Asn Leu Ile Gly Asp Phe Glu Val Ala Glu Lys Ile	7130
2320 2325 2330	
aat gcc ttc aga gcc aaa gtc cat gag tta atc gag agg tat gaa gta Asn Ala Phe Arg Ala Lys Val His Glu Leu Ile Glu Arg Tyr Glu Val	7178
2335 2340 2345 2350	
gac caa caa atc cag gtt tta atg gat aaa tta gta gag ttg acc cac Asp Gln Gln Ile Gln Val Leu Met Asp Lys Leu Val Glu Leu Thr His	7226
2355 2360 2365	
caa tac aag ttg aag gag act att cag aag cta agc aat gtc cta caa Gln Tyr Lys Leu Lys Glu Thr Ile Gln Lys Leu Ser Asn Val Leu Gln	7274
2370 2375 2380	
caa gtt aag ata aaa gat tac ttt gag aaa ttg gtt gga ttt att gat Gln Val Lys Ile Lys Asp Tyr Phe Glu Lys Leu Val Gly Phe Ile Asp	7322
2385 2390 2395	
gat gct gtg aag aag ctt aat gaa tta tct ttt aaa aca ttc att gaa Asp Ala Val Lys Lys Leu Asn Glu Leu Ser Phe Lys Thr Phe Ile Glu	7370
2400 2405 2410	
gat gtt aac aaa ttc ctt gac atg ttg ata aag aaa tta aag tca ttt Asp Val Asn Lys Phe Leu Asp Met Leu Ile Lys Lys Leu Lys Ser Phe	7418
2415 2420 2425 2430	
gat tac cac cag ttt gta gat gaa acc aat gac aaa atc cgt gag gtg Asp Tyr His Gln Phe Val Asp Glu Thr Asn Asp Lys Ile Arg Glu Val	7466
2435 2440 2445	
act cag aga ctc aat ggt gaa att cag gct ctg gaa cta cca caa aaa Thr Gln Arg Leu Asn Gly Glu Ile Gln Ala Leu Glu Leu Pro Gln Lys	7514
2450 2455 2460	
gct gaa gca tta aaa ctg ttt tta gag gaa acc aag gcc aca gtt gca Ala Glu Ala Leu Lys Leu Phe Leu Glu Glu Thr Lys Ala Thr Val Ala	7562
2465 2470 2475	
gtg tat ctg gaa agc cta cag gac acc aaa ata acc tta atc atc aat Val Tyr Leu Glu Ser Leu Gln Asp Thr Lys Ile Thr Leu Ile Ile Asn	7610
2480 2485 2490	
tgg tta cag gag gct tta agt tca gca tct ttg gct cac atg aag gcc Trp Leu Gln Glu Ala Leu Ser Ser Ala Ser Leu Ala His Met Lys Ala	7658
2495 2500 2505 2510	
aaa ttc cga gag act cta gaa gat aca cga gac cga atg tat caa atg Lys Phe Arg Glu Thr Leu Glu Asp Thr Arg Asp Arg Met Tyr Gln Met	7706
2515 2520 2525	
gac att cag cag gaa ctt caa cga tac ctg tct ctg gta ggc cag gtt	7754

Asp Ile Gln Gln Glu Leu Gln Arg Tyr Leu Ser Leu Val Gly Gln Val			
2530	2535	2540	
tat agc aca ctt gtc acc tac att tct gat tgg tgg act ctt gct gct			7802
Tyr Ser Thr Leu Val Thr Tyr Ile Ser Asp Trp Trp Thr Leu Ala Ala			
2545	2550	2555	
aag aac ctt act gac ttt gca gag caa tat tct atc caa gat tgg gct			7850
Lys Asn Leu Thr Asp Phe Ala Glu Gln Tyr Ser Ile Gln Asp Trp Ala			
2560	2565	2570	
aaa cgt atg aaa gca ttg gta gag caa ggg ttc act gtt cct gaa atc			7898
Lys Arg Met Lys Ala Leu Val Glu Gln Gly Phe Thr Val Pro Glu Ile			
2575	2580	2585	2590
aag acc atc ctt ggg acc atg cct gcc ttt gaa gtc agt ctt cag gct			7946
Lys Thr Ile Leu Gly Thr Met Pro Ala Phe Glu Val Ser Leu Gln Ala			
2595	2600	2605	
ctt cag aaa gct acc ttc cag aca cct gat ttt ata gtc ccc cta aca			7994
Leu Gln Lys Ala Thr Phe Gln Thr Pro Asp Phe Ile Val Pro Leu Thr			
2610	2615	2620	
gat ttg agg att cca tca gtt cag ata aac ttc aaa gac tta aaa aat			8042
Asp Leu Arg Ile Pro Ser Val Gln Ile Asn Phe Lys Asp Leu Lys Asn			
2625	2630	2635	
ata aaa atc cca tcc agg ttt tcc aca cca gaa ttt acc atc ctt aac			8090
Ile Lys Ile Pro Ser Arg Phe Ser Thr Pro Glu Phe Thr Ile Leu Asn			
2640	2645	2650	
acc ttc cac att cct tcc ttt aca att gac ttt gtc gaa atg aaa gta			8138
Thr Phe His Ile Pro Ser Phe Thr Ile Asp Phe Val Glu Met Lys Val			
2655	2660	2665	2670
aag atc atc aga acc att gac cag atg cag aac agt gag ctg cag tgg			8186
Lys Ile Ile Arg Thr Ile Asp Gln Met Gln Asn Ser Glu Leu Gln Trp			
2675	2680	2685	
ccc gtt cca gat ata tat ctc agg gat ctg aag gtg gag gac att cct			8234
Pro Val Pro Asp Ile Tyr Leu Arg Asp Leu Lys Val Glu Asp Ile Pro			
2690	2695	2700	
cta gcg aga atc acc ctc cca gac ttc cgt tta cca gaa atc gca att			8282
Leu Ala Arg Ile Thr Leu Pro Asp Phe Arg Leu Pro Glu Ile Ala Ile			
2705	2710	2715	
cca gaa ttc ata atc cca act ctc aac ctt aat gat ttt caa gtt cct			8330
Pro Glu Phe Ile Ile Pro Thr Leu Asn Leu Asn Asp Phe Gln Val Pro			
2720	2725	2730	
gac ctt cac ata cca gaa ttc cag ctt ccc cac atc tca cac aca att			8378
Asp Leu His Ile Pro Glu Phe Gln Leu Pro His Ile Ser His Thr Ile			
2735	2740	2745	2750
gaa gta cct act ttt ggc aag cta tac agt att ctg aaa atc caa tct			8426
Glu Val Pro Thr Phe Gly Lys Leu Tyr Ser Ile Leu Lys Ile Gln Ser			
2755	2760	2765	
cct ctt ttc aca tta gat gca aat gct gac ata ggg aat gga acc acc			8474
Pro Leu Phe Thr Leu Asp Ala Asn Ala Asp Ile Gly Asn Gly Thr Thr			

2770	2775	2780	
tca gca aac gaa gca ggt atc gca gct tcc atc act gcc aaa gga gag Ser Ala Asn Glu Ala Gly Ile Ala Ala Ser Ile Thr Ala Lys Gly Glu 2785	2790	2795	8522
tcc aaa tta gaa gtt ctc aat ttt gat ttt caa gca aat gca caa ctc Ser Lys Leu Glu Val Leu Asn Phe Asp Phe Gln Ala Asn Ala Gln Leu 2800	2805	2810	8570
tca aac cct aag att aat ccg ctg gct ctg aag gag tca gtg aag ttc Ser Asn Pro Lys Ile Asn Pro Leu Ala Leu Lys Glu Ser Val Lys Phe 2815	2820	2825	8618
tcc agc aag tac ctg aga acg gag cat ggg agt gaa atg ctg ttt ttt Ser Ser Lys Tyr Leu Arg Thr Glu His Gly Ser Glu Met Leu Phe Phe 2835	2840	2845	8666
gga aat gct att gag gga aaa tca aac aca gtg gca agt tta cac aca Gly Asn Ala Ile Glu Gly Lys Ser Asn Thr Val Ala Ser Leu His Thr 2850	2855	2860	8714
gaa aaa aat aca ctg gag ctt agt aat gga gtg att gtc aag ata aac Glu Lys Asn Thr Leu Glu Leu Ser Asn Gly Val Ile Val Lys Ile Asn 2865	2870	2875	8762
aat cag ctt acc ctg gat agc aac act aaa tac ttc cac aaa ttg aac Asn Gln Leu Thr Leu Asp Ser Asn Thr Lys Tyr Phe His Lys Leu Asn 2880	2885	2890	8810
atc ccc aaa ctg gac ttc tct agt cag gct gac ctg cgc aac gag atc Ile Pro Lys Leu Asp Phe Ser Ser Gln Ala Asp Leu Arg Asn Glu Ile 2895	2900	2905	8858
aag aca ctg ttg aaa gct ggc cac ata gca tgg act tct tct gga aaa Lys Thr Leu Leu Lys Ala Gly His Ile Ala Trp Thr Ser Ser Gly Lys 2915	2920	2925	8906
ggg tca tgg aaa tgg gcc tgc ccc aga ttc tca gat gag gga aca cat Gly Ser Trp Lys Trp Ala Cys Pro Arg Phe Ser Asp Glu Gly Thr His 2930	2935	2940	8954
gaa tca caa att agt ttc acc ata gaa gga ccc ctc act tcc ttt gga Glu Ser Gln Ile Ser Phe Thr Ile Glu Gly Pro Leu Thr Ser Phe Gly 2945	2950	2955	9002
ctg tcc aat aag atc aat agc aaa cac cta aga gta aac caa aac ttg Leu Ser Asn Lys Ile Asn Ser Lys His Leu Arg Val Asn Gln Asn Leu 2960	2965	2970	9050
gtt tat gaa tct ggc tcc ctc aac ttt tct aaa ctt gaa att caa tca Val Tyr Glu Ser Gly Ser Leu Asn Phe Ser Lys Leu Glu Ile Gln Ser 2975	2980	2985	9098
caa gtc gat tcc cag cat gtg ggc cac agt gtt cta act gct aaa ggc Gln Val Asp Ser Gln His Val Gly His Ser Val Leu Thr Ala Lys Gly 2995	3000	3005	9146
atg gca ctg ttt gga gaa ggg aag gca gag ttt act ggg agg cat gat Met Ala Leu Phe Gly Glu Gly Lys Ala Glu Phe Thr Gly Arg His Asp 3010	3015	3020	9194
gct cat tta aat gga aag gtt att gga act ttg aaa aat tct ctt ttc			9242

Ala His Leu Asn Gly Lys Val Ile Gly Thr Leu Lys Asn Ser Leu Phe			
3025	3030	3035	
ttt tca gcc cag cca ttt gag atc acg gca tcc aca aac aat gaa ggg			9290
Phe Ser Ala Gln Pro Phe Glu Ile Thr Ala Ser Thr Asn Asn Glu Gly			
3040	3045	3050	
aat ttg aaa gtt cgt ttt cca tta agg tta aca ggg aag ata gac ttc			9338
Asn Leu Lys Val Arg Phe Pro Leu Arg Leu Thr Gly Lys Ile Asp Phe			
3055	3060	3065	3070
ctg aat aac tat gca ctg ttt ctg agt ccc agt gcc cag caa gca agt			9386
Leu Asn Asn Tyr Ala Leu Phe Leu Ser Pro Ser Ala Gln Gln Ala Ser			
3075	3080	3085	
tgg caa gta agt gct agg ttc aat cag tat aag tac aac caa aat ttc			9434
Trp Gln Val Ser Ala Arg Phe Asn Gln Tyr Lys Tyr Asn Gln Asn Phe			
3090	3095	3100	
tct gct gga aac aac gag aac att atg gag gcc cat gta gga ata aat			9482
Ser Ala Gly Asn Asn Glu Asn Ile Met Glu Ala His Val Gly Ile Asn			
3105	3110	3115	
gga gaa gca aat ctg gat ttc tta aac att cct tta aca att cct gaa			9530
Gly Glu Ala Asn Leu Asp Phe Leu Asn Ile Pro Leu Thr Ile Pro Glu			
3120	3125	3130	
atg cgt cta cct tac aca ata atc aca act cct cca ctg aaa gat ttc			9578
Met Arg Leu Pro Tyr Thr Ile Ile Thr Thr Pro Pro Leu Lys Asp Phe			
3135	3140	3145	3150
tct cta tgg gaa aaa aca ggc ttg aag gaa ttc ttg aaa acg aca aag			9626
Ser Leu Trp Glu Lys Thr Gly Leu Lys Glu Phe Leu Lys Thr Thr Lys			
3155	3160	3165	
caa tca ttt gat tta agt gta aaa gct cag tat aag aaa aac aaa cac			9674
Gln Ser Phe Asp Leu Ser Val Lys Ala Gln Tyr Lys Lys Asn Lys His			
3170	3175	3180	
agg cat tcc atc aca aat cct ttg gct gtg ctt tgt gag ttt atc agt			9722
Arg His Ser Ile Thr Asn Pro Leu Ala Val Leu Cys Glu Phe Ile Ser			
3185	3190	3195	
cag agc atc aaa tcc ttt gac agg cat ttt gaa aaa aac aga aac aat			9770
Gln Ser Ile Lys Ser Phe Asp Arg His Phe Glu Lys Asn Arg Asn Asn			
3200	3205	3210	
gca tta gat ttt gtc acc aaa tcc tat aat gaa aca aaa att aag ttt			9818
Ala Leu Asp Phe Val Thr Lys Ser Tyr Asn Glu Thr Lys Ile Lys Phe			
3215	3220	3225	3230
gat aag tac aaa gct gaa aaa tct cac gac gag ctc ccc agg acc ttt			9866
Asp Lys Tyr Lys Ala Glu Lys Ser His Asp Glu Leu Pro Arg Thr Phe			
3235	3240	3245	
caa att cct gga tac act gtt cca gtt gtc aat gtt gaa gtg tct cca			9914
Gln Ile Pro Gly Tyr Thr Val Pro Val Val Asn Val Glu Val Ser Pro			
3250	3255	3260	
ttc acc ata gag atg tcg gca ttc ggc tat gtg ttc cca aaa gca gtc			9962
Phe Thr Ile Glu Met Ser Ala Phe Gly Tyr Val Phe Pro Lys Ala Val			

3265

3270

3275

agc atg cct agt ttc tcc atc cta ggt tct gac gtc cgt gtg cct tca Ser Met Pro Ser Phe Ser Ile Leu Gly Ser Asp Val Arg Val Pro Ser 3280	3285	3290	10010
tac aca tta atc ctg cca tca tta gag ctg cca gtc ctt cat gtc cct Tyr Thr Leu Ile Leu Pro Ser Leu Glu Leu Pro Val Leu His Val Pro 3295	3300	3305	10058
aga aat ctc aag ctt tct ctt cca cat ttc aag gaa ttg tgt acc ata Arg Asn Leu Lys Leu Ser Leu Pro His Phe Lys Glu Leu Cys Thr Ile 3315	3320	3325	10106
agc cat att ttt att cct gcc atg ggc aat att acc tat gat ttc tcc Ser His Ile Phe Ile Pro Ala Met Gly Asn Ile Thr Tyr Asp Phe Ser 3330	3335	3340	10154
ttt aaa tca agt gtc atc aca ctg aat acc aat gct gaa ctt ttt aac Phe Lys Ser Ser Val Ile Thr Leu Asn Thr Asn Ala Glu Leu Phe Asn 3345	3350	3355	10202
cag tca gat att gtt gct cat ctc ctt tct tca tct tca tct gtc att Gln Ser Asp Ile Val Ala His Leu Leu Ser Ser Ser Ser Val Ile 3360	3365	3370	10250
gat gca ctg cag tac aaa tta gag ggc acc aca aga ttg aca aga aaa Asp Ala Leu Gln Tyr Lys Leu Glu Gly Thr Thr Arg Leu Thr Arg Lys 3375	3380	3385	10298
agg gga ttg aag tta gcc aca gct ctg tct ctg agc aac aaa ttt gtg Arg Gly Leu Lys Leu Ala Thr Ala Leu Ser Leu Ser Asn Lys Phe Val 3395	3400	3405	10346
gag ggt agt cat aac agt act gtg agc tta acc acg aaa aat atg gaa Glu Gly Ser His Asn Ser Thr Val Ser Leu Thr Thr Lys Asn Met Glu 3410	3415	3420	10394
gtg tca gtg gca aaa acc aca aaa gcc gaa att cca att ttg aga atg Val Ser Val Ala Lys Thr Thr Lys Ala Glu Ile Pro Ile Leu Arg Met 3425	3430	3435	10442
aat ttc aag caa gaa ctt aat gga aat acc aag tca aaa cct act gtc Asn Phe Lys Gln Glu Leu Asn Gly Asn Thr Lys Ser Lys Pro Thr Val 3440	3445	3450	10490
tct tcc tcc atg gaa ttt aag tat gat ttc aat tct tca atg ctg tac Ser Ser Ser Met Glu Phe Lys Tyr Asp Phe Asn Ser Ser Met Leu Tyr 3455	3460	3465	10538
tct acc gct aaa gga gca gtt gac cac aag ctt agc ttg gaa agc ctc Ser Thr Ala Lys Gly Ala Val Asp His Lys Leu Ser Leu Glu Ser Leu 3475	3480	3485	10586
acc tct tac ttt tcc att gag tca tct acc aaa gga gat gtc aag ggt Thr Ser Tyr Phe Ser Ile Glu Ser Ser Thr Lys Gly Asp Val Lys Gly 3490	3495	3500	10634
tcg gtt ctt tct cgg gaa tat tca gga act att gct agt gag gcc aac Ser Val Leu Ser Arg Glu Tyr Ser Gly Thr Ile Ala Ser Glu Ala Asn 3505	3510	3515	10682
act tac ttg aat tcc aag agc aca cgg tct tca gtg aag ctg cag ggc			10730

Thr Tyr Leu Asn Ser Lys Ser Thr Arg Ser Ser Val Lys Leu Gln Gly			
3520	3525	3530	
act tcc aaa att gat gat atc tgg aac ctt gaa gta aaa gaa aat ttt			10778
Thr Ser Lys Ile Asp Asp Ile Trp Asn Leu Glu Val Lys Glu Asn Phe			
3535	3540	3545	3550
gct gga gaa gcc aca ctc caa cgc ata tat tcc ctc tgg gag cac agt			10826
Ala Gly Glu Ala Thr Leu Gln Arg Ile Tyr Ser Leu Trp Glu His Ser			
3555	3560	3565	
acg aaa aac cac tta cag cta gag ggc ctc ttt ttc acc aac gga gaa			10874
Thr Lys Asn His Leu Gln Leu Glu Gly Leu Phe Phe Thr Asn Gly Glu			
3570	3575	3580	
cat aca agc aaa gcc acc ctg gaa ctc tct cca tgg caa atg tca gct			10922
His Thr Ser Lys Ala Thr Leu Glu Leu Ser Pro Trp Gln Met Ser Ala			
3585	3590	3595	
c当地 ttt cag gtc cat gca agt cag ccc agt tcc ttc cat gat ttc cct			10970
Leu Val Gln Val His Ala Ser Gln Pro Ser Ser Phe His Asp Phe Pro			
3600	3605	3610	
gac ctt ggc cag gaa gtg gcc ctg aat gct aac act aag aac cag aag			11018
Asp Leu Gly Gln Glu Val Ala Leu Asn Ala Asn Thr Lys Asn Gln Lys			
3615	3620	3625	3630
atc aga tgg aaa aat gaa gtc cgg att cat tct ggg tct ttc cag agc			11066
Ile Arg Trp Lys Asn Glu Val Arg Ile His Ser Gly Ser Phe Gln Ser			
3635	3640	3645	
cag gtc gag ctt tcc aat gac caa gaa aag gca cac ctt gac att gca			11114
Gln Val Glu Leu Ser Asn Asp Gln Glu Lys Ala His Leu Asp Ile Ala			
3650	3655	3660	
gga tcc tta gaa gga cac cta agg ttc ctc aaa aat atc atc cta cca			11162
Gly Ser Leu Glu Gly His Leu Arg Phe Leu Lys Asn Ile Ile Leu Pro			
3665	3670	3675	
gtc tat gac aag agc tta tgg gat ttc cta aag ctg gat gta acc acc			11210
Val Tyr Asp Lys Ser Leu Trp Asp Phe Leu Lys Leu Asp Val Thr Thr			
3680	3685	3690	
agc att ggt agg aga cag cat ctt cgt gtt tca act gcc ttt gtg tac			11258
Ser Ile Gly Arg Arg Gln His Leu Arg Val Ser Thr Ala Phe Val Tyr			
3695	3700	3705	3710
acc aaa aac ccc aat ggc tat tca ttc tcc atc cct gta aaa gtt ttg			11306
Thr Lys Asn Pro Asn Gly Tyr Ser Phe Ser Ile Pro Val Lys Val Leu			
3715	3720	3725	
gct gat aaa ttc att act cct ggg ctg aaa cta aat gat cta aat tca			11354
Ala Asp Lys Phe Ile Thr Pro Gly Leu Lys Leu Asn Asp Leu Asn Ser			
3730	3735	3740	
gtt ctt gtc atg cct acg ttc cat gtc cca ttt aca gat ctt cag gtt			11402
Val Leu Val Met Pro Thr Phe His Val Pro Phe Thr Asp Leu Gln Val			
3745	3750	3755	

cca tcg tgc aaa ctt gac ttc aga gaa ata caa atc tat aag aag ctg Pro Ser Cys Lys Leu Asp Phe Arg Glu Ile Gln Ile Tyr Lys Lys Leu	3760	3765	3770	11450	
aga act tca tca ttt gcc ctc aac cta cca aca ctc ccc gag gta aaa Arg Thr Ser Ser Phe Ala Leu Asn Leu Pro Thr Leu Pro Glu Val Lys	3775	3780	3785	3790	11498
ttc cct gaa gtt gat gtg tta aca aaa tat tct caa cca gaa gac tcc Phe Pro Glu Val Asp Val Leu Thr Lys Tyr Ser Gln Pro Glu Asp Ser	3795	3800	3805		11546
ttg att ccc ttt ttt gag ata acc gtg cct gaa tct cag tta act gtg Leu Ile Pro Phe Glu Ile Thr Val Pro Glu Ser Gln Leu Thr Val	3810	3815	3820		11594
tcc cag ttc acg ctt cca aaa agt gtt tca gat ggc att gct gct ttg Ser Gln Phe Thr Leu Pro Lys Ser Val Ser Asp Gly Ile Ala Ala Leu	3825	3830	3835		11642
gat cta aat gca gta gcc aac aag atc gca gac ttt gag ttg ccc acc Asp Leu Asn Ala Val Ala Asn Lys Ile Ala Asp Phe Glu Leu Pro Thr	3840	3845	3850		11690
atc atc gtg cct gag cag acc att gag att ccc tcc att aag ttc tct Ile Ile Val Pro Glu Gln Thr Ile Glu Ile Pro Ser Ile Lys Phe Ser	3855	3860	3865	3870	11738
gta cct gct gga att gtc att cct tcc ttt caa gca ctg act gca cgc Val Pro Ala Gly Ile Val Ile Pro Ser Phe Gln Ala Leu Thr Ala Arg	3875	3880	3885		11786
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aaa aac aaa gca gat tat gtt gaa aca gtc ctg gat tcc aca tgc agc Lys Asn Lys Ala Asp Tyr Val Glu Thr Val Leu Asp Ser Thr Cys Ser	3905	3910	3915		11882
tca acc gta cag ttc cta gaa tat gaa cta aat gtt ttg gga aca cac Ser Thr Val Gln Phe Leu Glu Tyr Glu Leu Asn Val Leu Gly Thr His	3920	3925	3930		11930
aaa atc gaa gat ggt acg tta gcc tct aag act aaa gga aca ctt gca Lys Ile Glu Asp Gly Thr Leu Ala Ser Lys Thr Lys Gly Thr Leu Ala	3935	3940	3945	3950	11978
cac cgt gac ttc agt gca gaa tat gaa gaa gat ggc aaa ttt gaa gga His Arg Asp Phe Ser Ala Glu Tyr Glu Glu Asp Gly Lys Phe Glu Gly	3955	3960	3965		12026
ctt cag gaa tgg gaa gga aaa gcg cac ctc aat atc aaa agc cca gcg Leu Gln Glu Trp Glu Gly Lys Ala His Leu Asn Ile Lys Ser Pro Ala	3970	3975	3980		12074
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gaa gat gac gac ttt tct aaa tgg aac ttc tac tac agc cct cag tcc Glu Asp Asp Asp Phe Ser Lys Trp Asn Phe Tyr Tyr Ser Pro Gln Ser 4015 4020 4025 4030			12218
tct cca gat aaa aaa ctc acc ata ttc aaa act gag ttg agg gtc cgg Ser Pro Asp Lys Lys Leu Thr Ile Phe Lys Thr Glu Leu Arg Val Arg 4035 4040 4045			12266
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ctc acc ctg aga gaa gtg tct tca aag ctg aga aga aat ctg cag aac Leu Thr Leu Arg Glu Val Ser Ser Lys Leu Arg Arg Asn Leu Gln Asn 4095 4100 4105 4110			12458
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ttc gag tta agg aaa cat aaa cta ata gat gta atc tcg atg tat agg			12938

Phe Glu Leu Arg Lys His Lys Leu Ile Asp Val Ile Ser Met Tyr Arg			
4255	4260	4265	4270
gaa ctg ttg aaa gat tta tca aaa gaa gcc caa gag gta ttt aaa gcc			12986
Glu Leu Leu Lys Asp Leu Ser Lys Glu Ala Gln Glu Val Phe Lys Ala			
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Ile Gln Ser Leu Lys Thr Thr Glu Val Leu Arg Asn Leu Gln Asp Leu			
4290	4295	4300	
tta caa ttc att ttc caa cta ata gaa gat aac att aaa cag ctg aaa			13082
Leu Gln Phe Ile Phe Gln Leu Ile Glu Asp Asn Ile Lys Gln Leu Lys			
4305	4310	4315	
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Glu Met Lys Phe Thr Tyr Leu Ile Asn Tyr Ile Gln Asp Glu Ile Asn			
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aca atc ttc aat gat tat atc cca tat gtt ttt aaa ttg ttg aaa gaa			13178
Thr Ile Phe Asn Asp Tyr Ile Pro Tyr Val Phe Lys Leu Leu Lys Glu			
4335	4340	4345	4350
aac cta tgc ctt aat ctt cat aag ttc aat gaa ttt att caa aac gag			13226
Asn Leu Cys Leu Asn Leu His Lys Phe Asn Glu Phe Ile Gln Asn Glu			
4355	4360	4365	
ctt cag gaa gct tct caa gag tta cag cag atc cat caa tac att atg			13274
Leu Gln Glu Ala Ser Gln Glu Leu Gln Ile His Gln Tyr Ile Met			
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gcc ctt cgt gaa gaa tat ttt gat cca agt ata gtt ggc tgg aca gtg			13322
Ala Leu Arg Glu Glu Tyr Phe Asp Pro Ser Ile Val Gly Trp Thr Val			
4385	4390	4395	
aaa tat tat gaa ctt gaa gaa aag ata gtc agt ctg atc aag aac ctg			13370
Lys Tyr Tyr Glu Leu Glu Lys Ile Val Ser Leu Ile Lys Asn Leu			
4400	4405	4410	
tta gtt gct ctt aag gac ttc cat tct gaa tat att gtc agt gcc tct			13418
Leu Val Ala Leu Lys Asp Phe His Ser Glu Tyr Ile Val Ser Ala Ser			
4415	4420	4425	4430
aac ttt act tcc caa ctc tca agt caa gtt gag caa ttt ctg cac aga			13466
Asn Phe Thr Ser Gln Leu Ser Ser Gln Val Glu Gln Phe Leu His Arg			
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aat att cag gaa tat ctt agc atc ctt acc gat cca gat gga aaa ggg			13514
Asn Ile Gln Glu Tyr Leu Ser Ile Leu Thr Asp Pro Asp Gly Lys Gly			
4450	4455	4460	
aaa gag aag att gca gag ctt tct gcc act gct cag gaa ata att aaa			13562
Lys Glu Lys Ile Ala Glu Leu Ser Ala Thr Ala Gln Glu Ile Ile Lys			
4465	4470	4475	
agc cag gcc att gcg acg aag aaa ata att tct gat tac cac cag cag			13610
Ser Gln Ala Ile Ala Thr Lys Lys Ile Ile Ser Asp Tyr His Gln Gln			
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Phe Arg Tyr Lys Leu Gln Asp Phe Ser Asp Gln Leu Ser Asp Tyr Tyr			

4495	4500	4505	4510	
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caa tca acc aca gtc atg aac ccc tac atg aag ctt gct cca gga gaa Gln Ser Thr Thr Val Met Asn Pro Tyr Met Lys Leu Ala Pro Gly Glu 4545 4550 4555				13802
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Met Asp Pro Pro Arg Pro Ala Leu Leu Ala Leu Leu Ala Leu Pro Ala			
1 5 10 15			
ctg ctg ctg ctg ctg gcg ggc gcc agg gcc gaa gag gaa atg ctg			96
Leu Leu Leu Leu Leu Ala Gly Ala Arg Ala Glu Glu Met Leu			
20 25 30			
gaa aat gtc agc ctg gtc tgt cca aaa gat gcg acc cga ttc aag cac			144
Glu Asn Val Ser Leu Val Cys Pro Lys Asp Ala Thr Arg Phe Lys His			
35 40 45			
ctc cgg aag tac aca tac aac tat gag gct gag agt tcc agt gga gtc			192
Leu Arg Lys Tyr Thr Asn Tyr Glu Ala Glu Ser Ser Ser Gly Val			
50 55 60			
cct ggg act gct gat tca aga agt gcc acc agg atc aac tgc aag gtt			240
Pro Gly Thr Ala Asp Ser Arg Ser Ala Thr Arg Ile Asn Cys Lys Val			
65 70 75 80			
gag ctg gag gtt ccc cag ctc tgc agc ttc atc ctg aag acc agc cag			288
Glu Leu Glu Val Pro Gln Leu Cys Ser Phe Ile Leu Lys Thr Ser Gln			
85 90 95			
tgc acc ctg aaa gag gtg tat ggc ttc aac cct gag ggc aaa gcc ttg			336
Cys Thr Leu Lys Glu Val Tyr Gly Phe Asn Pro Glu Gly Lys Ala Leu			
100 105 110			
ctg aag aaa acc aag aac tct gag gag ttt gct gca gcc atg tcc agg			384
Leu Lys Lys Thr Lys Asn Ser Glu Glu Phe Ala Ala Ala Met Ser Arg			
115 120 125			
tat gag ctc aag ctg gcc att cca gaa ggg aag cag gtt ttc ctt tac			432
Tyr Glu Leu Lys Leu Ala Ile Pro Glu Gly Lys Gln Val Phe Leu Tyr			
130 135 140			
ccg gag aaa gat gaa cct act tac atc ctg aac atc aag agg ggc atc			480
Pro Glu Lys Asp Glu Pro Thr Tyr Ile Leu Asn Ile Lys Arg Gly Ile			
145 150 155 160			

att tct gcc ctc ctg gtt ccc cca gag aca gaa gaa gcc aag caa gtg Ile Ser Ala Leu Leu Val Pro Pro Glu Thr Glu Glu Ala Lys Gln Val	165                    170                    175	528
ttg ttt ctg gat acc gtg tat gga aac tgc tcc act cac ttt acc gtc Leu Phe Leu Asp Thr Val Tyr Gly Asn Cys Ser Thr His Phe Thr Val	180                    185                    190	576
aag acg agg aag ggc aat gtg gca aca gaa ata tcc act gaa aga gac Lys Thr Arg Lys Gly Asn Val Ala Thr Glu Ile Ser Thr Glu Arg Asp	195                    200                    205	624
ctg ggg cag tgt gat cgc ttc aag ccc atc cgc aca ggc atc agc cca Leu Gly Gln Cys Asp Arg Phe Lys Pro Ile Arg Thr Gly Ile Ser Pro	210                    215                    220	672
ctt gct ctc atc aaa ggc atg acc cgc ccc ttg tca act ctg atc agc Leu Ala Leu Ile Lys Gly Met Thr Arg Pro Leu Ser Thr Leu Ile Ser	225                    230                    235	720
agc agc cag tcc tgt cag tac aca ctg gac gct aag agg aag cat gtg Ser Ser Gln Ser Cys Gln Tyr Thr Leu Asp Ala Lys Arg Lys His Val	245                    250                    255	768
gca gaa gcc atc tgc aag gag caa cac ctc ttc ctg cct ttc tcc tac Ala Glu Ala Ile Cys Lys Glu Gln His Leu Phe Leu Pro Phe Ser Tyr	260                    265                    270	816
aag aat aag tat ggg atg gta gca caa gtg aca cag act ttg aaa ctt Lys Asn Lys Tyr Met Val Ala Gln Val Thr Gln Thr Leu Lys Leu	275                    280                    285	864
gaa gac aca cca aag atc aac agc cgc ttc ttt ggt gaa ggt act aag Glu Asp Thr Pro Lys Ile Asn Ser Arg Phe Phe Gly Glu Gly Thr Lys	290                    295                    300	912
aag atg ggc ctc gca ttt gag agc acc aaa tcc aca tca cct cca aag Lys Met Gly Leu Ala Phe Glu Ser Thr Lys Ser Thr Ser Pro Pro Lys	305                    310                    315	960
cag gcc gaa gct gtt ttg aag act ctc cag gaa ctg aaa aaa cta acc Gln Ala Glu Ala Val Leu Lys Thr Leu Gln Glu Leu Lys Lys Leu Thr	325                    330                    335	1008
atc tct gag caa aat atc cag aga gct aat ctc ttc aat aag ctg gtt Ile Ser Glu Gln Asn Ile Gln Arg Ala Asn Leu Phe Asn Lys Leu Val	340                    345                    350	1056
act gag ctg aga ggc ctc agt gat gaa gca gtc aca tct ctc ttg cca Thr Glu Leu Arg Gly Leu Ser Asp Glu Ala Val Thr Ser Leu Leu Pro	355                    360                    365	1104
cag ctg att gag gtg tcc agc ccc atc act tta caa gcc ttg gtt cag Gln Leu Ile Glu Val Ser Ser Pro Ile Thr Leu Gln Ala Leu Val Gln	370                    375                    380	1152
tgt gga cag cct cag tgc tcc act cac atc ctc cag tgg ctg aaa cgt Cys Gly Gln Pro Gln Cys Ser Thr His Ile Leu Gln Trp Leu Lys Arg	385                    390                    395	1200

gtg cat gcc aac ccc ctt ctg ata gat gtg gtc acc tac ctg gtg gcc Val His Ala Asn Pro Leu Leu Ile Asp Val Val Thr Tyr Leu Val Ala 405 410 415	1248
ctg atc ccc gag ccc tca gca cag cag ctg cga gag atc ttc aac atg Leu Ile Pro Glu Pro Ser Ala Gln Gln Leu Arg Glu Ile Phe Asn Met 420 425 430	1296
gcg agg gat cag cgc agc cga gcc acc ttg tat gcg ctg agc cac gcg Ala Arg Asp Gln Arg Ser Arg Ala Thr Leu Tyr Ala Leu Ser His Ala 435 440 445	1344
gtc aac aac tat cat aag aca aac cct aca ggg acc cag gag ctg ctg Val Asn Asn Tyr His Lys Thr Asn Pro Thr Gly Thr Gln Glu Leu Leu 450 455 460	1392
gac att gct aat tac ctg atg gaa cag att caa gat gac tgc act ggg Asp Ile Ala Asn Tyr Leu Met Glu Gln Ile Gln Asp Asp Cys Thr Gly 465 470 475 480	1440
gat gaa gat tac acc tat ttg att ctg cg <sup>g</sup> gtc att gga aat atg ggc Asp Glu Asp Tyr Thr Tyr Leu Ile Leu Arg Val Ile Gly Asn Met Gly 485 490 495	1488
caa acc atg gag cag tta act cca gaa ctc aag tct tca atc ctg aaa Gln Thr Met Glu Gln Leu Thr Pro Glu Leu Lys Ser Ser Ile Leu Lys 500 505 510	1536
tgt gtc caa agt aca aag cca tca ctg atg atc cag aaa gct gcc atc Cys Val Gln Ser Thr Lys Pro Ser Leu Met Ile Gln Lys Ala Ala Ile 515 520 525	1584
cag gct ctg cg <sup>g</sup> aaa atg gag cct aaa gac aag gac cag gag gtt ctt Gln Ala Leu Arg Lys Met Glu Pro Lys Asp Lys Asp Gln Glu Val Leu 530 535 540	1632
ctt cag act ttc ctt gat gat gct tct ccg gga gat aag cga ctg gct Leu Gln Thr Phe Leu Asp Asp Ala Ser Pro Gly Asp Lys Arg Leu Ala 545 550 555 560	1680
gcc tat ctt atg ttg atg agg agt cct tca cag gca gat att aac aaa Ala Tyr Leu Met Leu Met Arg Ser Pro Ser Gln Ala Asp Ile Asn Lys 565 570 575	1728
att gtc caa att cta cca tgg gaa cag aat gag caa gtg aag aac ttt Ile Val Gln Ile Leu Pro Trp Glu Gln Asn Glu Gln Val Lys Asn Phe 580 585 590	1776
gtg gct tcc cat att gcc aat atc ttg aac tca gaa gaa ttg gat atc Val Ala Ser His Ile Ala Asn Ile Leu Asn Ser Glu Glu Leu Asp Ile 595 600 605	1824
caa gat ctg aaa aag tta gtg aaa gaa gct ctg aaa gaa tct caa ctt Gln Asp Leu Lys Lys Leu Val Lys Glu Ala Leu Lys Glu Ser Gln Leu 610 615 620	1872
cca act gtc atg gac ttc aga aaa ttc tct ccg aac tat caa ctc tac Pro Thr Val Met Asp Phe Arg Lys Phe Ser Arg Asn Tyr Gln Leu Tyr 625 630 635 640	1920
aaa tct gtt tct ctt cca tca ctt gac cca gcc tca gcc aaa ata gaa Lys Ser Val Ser Leu Pro Ser Leu Asp Pro Ala Ser Ala Lys Ile Glu 645 650 655	1968

ggg aat ctt ata ttt gat cca aat aac tac ctt cct aaa gaa agc atg Gly Asn Leu Ile Phe Asp Pro Asn Asn Tyr Leu Pro Lys Glu Ser Met 660 665 670	2016
ctg aaa act acc ctc act gcc ttt gga ttt gct tca gct gac ctc atc Leu Lys Thr Thr Leu Thr Ala Phe Gly Phe Ala Ser Ala Asp Leu Ile 675 680 685	2064
gag att ggc ttg gaa gga aaa ggc ttt gag cca aca ttg gag gct cct Glu Ile Gly Leu Glu Gly Lys Gly Phe Glu Pro Thr Leu Glu Ala Pro 690 695 700	2112
ttt ggg aag caa gga ttt ttc cca gac agt gtc aac aaa gct ttg tac Phe Gly Lys Gln Gly Phe Phe Pro Asp Ser Val Asn Lys Ala Leu Tyr 705 710 715 720	2160
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cac ttt ggc tat acc aaa gat gat aaa cat gag cag gat atg gta aat His Phe Gly Tyr Thr Lys Asp Asp Lys His Glu Gln Asp Met Val Asn 740 745 750	2256
gga ata atg ctc agt gtt gag aag ctg att aaa gat ttg aaa tcc aaa Gly Ile Met Leu Ser Val Glu Lys Leu Ile Lys Asp Leu Lys Ser Lys 755 760 765	2304
gaa gtc ccg gaa gcc aga gcc tac ctc cgc atc ttg gga gag gag ctt Glu Val Pro Glu Ala Arg Ala Tyr Leu Arg Ile Leu Gly Glu Glu Leu 770 775 780	2352
ggt ttt gcc agt ctc cat gac ctc cga ctc ctg gga aag ctg ctt ctg Gly Phe Ala Ser Leu His Asp Leu Arg Leu Leu Gly Lys Leu Leu Leu 785 790 795 800	2400
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atc agg aag ggc tca aag aat gac ttt ttt ctt cac tac atc ttc atg Ile Arg Lys Gly Ser Lys Asn Asp Phe Phe Leu His Tyr Ile Phe Met 820 825 830	2496
gag aat gcc ttt gaa ctc ccc act gga gct gga tta cag ttgcaa ata Glu Asn Ala Phe Glu Leu Pro Thr Gly Ala Gly Leu Gln Leu Gln Ile 835 840 845	2544
tct tca tct gga gtc att gct ccc gga gcc aag gct gga gta aaa ctg Ser Ser Ser Gly Val Ile Ala Pro Gly Ala Lys Ala Gly Val Lys Leu 850 855 860	2592
gaa gta gcc aac atg cag gct gaa ctg gtg gca aaa ccc tcc gtg tct Glu Val Ala Asn Met Gln Ala Glu Leu Val Ala Lys Pro Ser Val Ser 865 870 875 880	2640
gtg gag ttt gtg aca aat atg ggc atc atc att ccg gac ttc gct agg Val Glu Phe Val Thr Asn Met Gly Ile Ile Ile Pro Asp Phe Ala Arg 885 890 895	2688

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gct cat gtt gcc cta aaa gct ggg aag ctg aag ttt atc att cct tcc Ala His Val Ala Leu Lys Ala Gly Lys Leu Lys Phe Ile Ile Pro Ser 915 920 925	2784
cca aag aga cca gtc aag ctg ctc agt gga ggc aac aca tta cat ttg Pro Lys Arg Pro Val Lys Leu Leu Ser Gly Gly Asn Thr Leu His Leu 930 935 940	2832
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acc tca ggc gct tac tcc aac gcc agc tcc aca gac tcc gcc tcc tac Thr Ser Gly Ala Tyr Ser Asn Ala Ser Ser Thr Asp Ser Ala Ser Tyr 980 985 990	2976
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Ser Ala Thr Ala Tyr Gly Ser Thr Val Ser Lys Arg Val Ala Trp His			
1155	1160	1165	
tat gat gaa gag aag att gaa ttt gaa tgg aac aca ggc acc aat gta		3552	
Tyr Asp Glu Glu Lys Ile Glu Phe Glu Trp Asn Thr Gly Thr Asn Val			
1170	1175	1180	
gat acc aaa aaa atg act tcc aat ttc cct gtg gat ctc tcc gat tat		3600	
Asp Thr Lys Lys Met Thr Ser Asn Phe Pro Val Asp Leu Ser Asp Tyr			
1185	1190	1195	1200
cct aag agc ttg cat atg tat gct aat aga ctc ctg gat cac aga gtc		3648	
Pro Lys Ser Leu His Met Tyr Ala Asn Arg Leu Leu Asp His Arg Val			
1205	1210	1215	
cct caa aca gac atg act ttc cgg cac gtg ggt tcc aaa tta ata gtt		3696	
Pro Gln Thr Asp Met Thr Phe Arg His Val Gly Ser Lys Leu Ile Val			
1220	1225	1230	
gca atg agc tca ttg ctt cag aag gca tct ggg agt ctt cct tat acc		3744	
Ala Met Ser Ser Trp Leu Gln Lys Ala Ser Gly Ser Leu Pro Tyr Thr			
1235	1240	1245	
cag act ttg caa gac cac ctc aat agc ctg aag gag ttc aac ctc cag		3792	
Gln Thr Leu Gln Asp His Leu Asn Ser Leu Lys Glu Phe Asn Leu Gln			
1250	1255	1260	
aac atg gga ttg cca gac tcc cac atc cca gaa aac ctc ttc tta aaa		3840	
Asn Met Gly Leu Pro Asp Ser His Ile Pro Glu Asn Leu Phe Leu Lys			
1265	1270	1275	1280
agc gat ggc cgc gtc aaa tat acc ttg aac aag aac agt ttg aaa att		3888	
Ser Asp Gly Arg Val Lys Tyr Thr Leu Asn Lys Asn Ser Leu Lys Ile			
1285	1290	1295	
gag att cct ttg cct ttt ggt ggc aaa tcc tcc aga gat cta aag atg		3936	
Glu Ile Pro Leu Pro Phe Gly Gly Lys Ser Ser Arg Asp Leu Lys Met			
1300	1305	1310	
tta gag act gtt agg aca cca gcc ctc cac ttc aag tct gtg gga ttc		3984	
Leu Glu Thr Val Arg Thr Pro Ala Leu His Phe Lys Ser Val Gly Phe			
1315	1320	1325	
cat ctg cca tct cga gag ttc caa gtc cct act ttt acc att ccc aag		4032	
His Leu Pro Ser Arg Glu Phe Gln Val Pro Thr Phe Thr Ile Pro Lys			
1330	1335	1340	
ttg tat caa ctg caa gtg cct ctc ctg ggt gtt cta gac ctc tcc acg		4080	
Leu Tyr Gln Leu Gln Val Pro Leu Leu Gly Val Leu Asp Leu Ser Thr			
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aat gtc tac agc aac ttg tac aac tgg tcc gcc tcc tac agt ggt ggc		4128	
Asn Val Tyr Ser Asn Leu Tyr Asn Trp Ser Ala Ser Tyr Ser Gly Gly			
1365	1370	1375	
aac acc agc aca gac cat ttc agc ctt cgg gct cgt tac cac atg aag		4176	
Asn Thr Ser Thr Asp His Phe Ser Leu Arg Ala Arg Tyr His Met Lys			
1380	1385	1390	

gct gac tct gtg gtt gac ctg ctt tcc tac aat gtg caa gga tct gga Ala Asp Ser Val Val Asp Leu Leu Ser Tyr Asn Val Gln Gly Ser Gly 1395 1400 1405	4224
gaa aca aca tat gac cac aag aat acg ttc aca cta tca tgt gat ggg Glu Thr Thr Tyr Asp His Lys Asn Thr Phe Thr Leu Ser Cys Asp Gly 1410 1415 1420	4272
tct cta cgc cac aaa ttt cta gat tcg aat atc aaa ttc agt cat gta Ser Leu Arg His Lys Phe Leu Asp Ser Asn Ile Lys Phe Ser His Val 1425 1430 1435 1440	4320
gaa aaa ctt gga aac aac cca gtc tca aaa ggt tta cta ata ttc gat Glu Lys Leu Gly Asn Asn Pro Val Ser Lys Gly Leu Leu Ile Phe Asp 1445 1450 1455	4368
gca tct agt tcc tgg gga cca cag atg tct gct tca gtt cat ttg gac Ala Ser Ser Ser Trp Gly Pro Gln Met Ser Ala Ser Val His Leu Asp 1460 1465 1470	4416
tcc aaa aag aaa cag cat ttg ttt gtc aaa gaa gtc aag att gat ggg Ser Lys Lys Gln His Leu Phe Val Lys Glu Val Lys Ile Asp Gly 1475 1480 1485	4464
cag ttc aga gtc tct tcg ttc tat gct aaa ggc aca tat ggc ctg tct Gln Phe Arg Val Ser Ser Phe Tyr Ala Lys Gly Thr Tyr Gly Leu Ser 1490 1495 1500	4512
tgt cag agg gat cct aac act ggc cgg ctc aat gga gag tcc aac ctg Cys Gln Arg Asp Pro Asn Thr Gly Arg Leu Asn Gly Glu Ser Asn Leu 1505 1510 1515 1520	4560
agg ttt aac tcc tcc tac ctc caa ggc acc aac cag ata aca gga aga Arg Phe Asn Ser Ser Tyr Leu Gln Gly Thr Asn Gln Ile Thr Gly Arg 1525 1530 1535	4608
tat gaa gat gga acc ctc tcc ctc acc tcc acc tct gat ctg caa agt Tyr Glu Asp Gly Thr Leu Ser Leu Thr Ser Thr Ser Asp Leu Gln Ser 1540 1545 1550	4656
ggc atc att aaa aat act gct tcc cta aag tat gag aac tac gag ctg Gly Ile Ile Lys Asn Thr Ala Ser Leu Lys Tyr Glu Asn Tyr Glu Leu 1555 1560 1565	4704
act tta aaa tct gac acc aat ggg aag tat aag aac ttt gcc act tct Thr Leu Lys Ser Asp Thr Asn Gly Lys Tyr Lys Asn Phe Ala Thr Ser 1570 1575 1580	4752
aac aag atg gat atg acc ttc tct aag caa aat gca ctg ctg cgt tct Asn Lys Met Asp Met Thr Phe Ser Lys Gln Asn Ala Leu Leu Arg Ser 1585 1590 1595 1600	4800
gaa tat cag gct gat tac gag tca ttg agg ttc ttc agc ctg ctt tct Glu Tyr Gln Ala Asp Tyr Glu Ser Leu Arg Phe Phe Ser Leu Leu Ser 1605 1610 1615	4848
gga tca cta aat tcc cat ggt ctt gag tta aat gct gac atc tta ggc Gly Ser Leu Asn Ser His Gly Leu Glu Leu Asn Ala Asp Ile Leu Gly 1620 1625 1630	4896
act gac aaa att aat agt ggt gct cac aag gcg aca cta agg att ggc	4944

Thr Asp Lys Ile Asn Ser Gly Ala His Lys Ala Thr Leu Arg Ile Gly			
1635	1640	1645	
caa gat gga ata tct acc agt gca acg acc aac ttg aag tgt agt ctc		4992	
Gln Asp Gly Ile Ser Thr Ser Ala Thr Thr Asn Leu Lys Cys Ser Leu			
1650	1655	1660	
ctg gtg ctg gag aat gag ctg aat gca gag ctt ggc ctc tct ggg gca		5040	
Leu Val Leu Glu Asn Glu Leu Asn Ala Glu Leu Gly Leu Ser Gly Ala			
1665	1670	1675	1680
tct atg aaa tta aca aca aat ggc cgc ttc agg gaa cac aat gca aaa		5088	
Ser Met Lys Leu Thr Thr Asn Gly Arg Phe Arg Glu His Asn Ala Lys			
1685	1690	1695	
ttc agt ctg gat ggg aaa gcc gcc ctc aca gag cta tca ctg gga agt		5136	
Phe Ser Leu Asp Gly Lys Ala Ala Leu Thr Glu Leu Ser Leu Gly Ser			
1700	1705	1710	
gct tat cag gcc atg att ctg ggt gtc gac agc aaa aac att ttc aac		5184	
Ala Tyr Gln Ala Met Ile Leu Gly Val Asp Ser Lys Asn Ile Phe Asn			
1715	1720	1725	
ttc aag gtc agt caa gaa gga ctt aag ctc tca aat gac atg atg ggc		5232	
Phe Lys Val Ser Gln Glu Gly Leu Lys Leu Ser Asn Asp Met Met Gly			
1730	1735	1740	
tca tat gct gaa atg aaa ttt gac cac aca aac agt ctg aac att gca		5280	
Ser Tyr Ala Glu Met Lys Phe Asp His Thr Asn Ser Leu Asn Ile Ala			
1745	1750	1755	1760
ggc tta tca ctg gac ttc tct tca aaa ctt gac aac att tac agc tct		5328	
Gly Leu Ser Leu Asp Phe Ser Ser Lys Leu Asp Asn Ile Tyr Ser Ser			
1765	1770	1775	
gac aag ttt tat aag caa act gtt aat tta cag cta cag ccc tat tct		5376	
Asp Lys Phe Tyr Lys Gln Thr Val Asn Leu Gln Leu Gln Pro Tyr Ser			
1780	1785	1790	
ctg gta act act tta aac agt gac ctg aaa tac aat gct ctg gat ctc		5424	
Leu Val Thr Thr Leu Asn Ser Asp Leu Lys Tyr Asn Ala Leu Asp Leu			
1795	1800	1805	
acc aac aat ggg aaa cta cggt cta gaa ccc ctg aag ctg cat gtg gct		5472	
Thr Asn Asn Gly Lys Leu Arg Leu Glu Pro Leu Lys Leu His Val Ala			
1810	1815	1820	
ggt aac cta aaa gga gcc tac caa aat aat gaa ata aaa cac atc tat		5520	
Gly Asn Leu Lys Gly Ala Tyr Gln Asn Asn Glu Ile Lys His Ile Tyr			
1825	1830	1835	1840
gcc atc tct tct gct gcc tta tca gca agc tat aaa gca gac act gtt		5568	
Ala Ile Ser Ser Ala Ala Leu Ser Ala Ser Tyr Lys Ala Asp Thr Val			
1845	1850	1855	
gct aag gtt cag ggt gtg gag ttt agc cat ggg ctc aac aca gac atc		5616	
Ala Lys Val Gln Gly Val Glu Phe Ser His Gly Leu Asn Thr Asp Ile			
1860	1865	1870	
gct ggg ctg gct tca gcc att gac atg agc aca aac tat aat tca gac		5664	
Ala Gly Leu Ala Ser Ala Ile Asp Met Ser Thr Asn Tyr Asn Ser Asp			
1875	1880	1885	

tca ctg cat ttc agc aat gtc ttc cgt tct gta atg gcc ccg ttt acc Ser Leu His Phe Ser Asn Val Phe Arg Ser Val Met Ala Pro Phe Thr 1890 1895 1900	5712
atg acc atc gat gca cat aca aat ggc aat ggg aaa ctc gct ctc tgg Met Thr Ile Asp Ala His Thr Asn Gly Asn Gly Lys Leu Ala Leu Trp 1905 1910 1915 1920	5760
gga gaa cat act ggg cag ctg tat agc aaa ttc ctg ttg aaa gca gaa Gly Glu His Thr Gly Gln Leu Tyr Ser Lys Phe Leu Leu Lys Ala Glu 1925 1930 1935	5808
cct ctg gca ttt act ttc tct cat gat tac aaa ggc tcc aca agt cat Pro Leu Ala Phe Thr Phe Ser His Asp Tyr Lys Gly Ser Thr Ser His 1940 1945 1950	5856
cat ctc gtg tct agg aaa agc atc agt gca gct ctt gaa cac aaa gtc His Leu Val Ser Arg Lys Ser Ile Ser Ala Ala Leu Glu His Lys Val 1955 1960 1965	5904
agt gcc ctg ctt act cca gct gag cag aca ggc acc tgg aaa ctc aag Ser Ala Leu Leu Thr Pro Ala Glu Gln Thr Gly Thr Trp Lys Leu Lys 1970 1975 1980	5952
acc caa ttt aac aac aat gaa tac agc cag gac ttg gat gct tac aac Thr Gln Phe Asn Asn Asn Glu Tyr Ser Gln Asp Leu Asp Ala Tyr Asn 1985 1990 1995 2000	6000
act aaa gat aaa att ggc gtg gag ctt act gga cga act ctg gct gac Thr Lys Asp Lys Ile Gly Val Glu Leu Thr Gly Arg Thr Leu Ala Asp 2005 2010 2015	6048
cta act cta cta gac tcc cca att aaa gtg cca ctt tta ctc agt gag Leu Thr Leu Leu Asp Ser Pro Ile Lys Val Pro Leu Leu Leu Ser Glu 2020 2025 2030	6096
ccc atc aat atc aat gat gct tta gag atg aga gat gcc gtt gag aag Pro Ile Asn Ile Asn Asp Ala Leu Glu Met Arg Asp Ala Val Glu Lys 2035 2040 2045	6144
ccc caa gaa ttt aca att gtt gct ttt gta aag tat gat aaa aac caa Pro Gln Glu Phe Thr Ile Val Ala Phe Val Lys Tyr Asp Lys Asn Gln 2050 2055 2060	6192
gat gtt cac tcc att aac ctc cca ttt ttg gag acc ttg caa gaa tat Asp Val His Ser Ile Asn Leu Pro Phe Phe Glu Thr Leu Gln Glu Tyr 2065 2070 2075 2080	6240
ttt gag agg aat cga caa acc att ata gtt gta ctg gaa aac gta cag Phe Glu Arg Asn Arg Gln Thr Ile Ile Val Val Leu Glu Asn Val Gln 2085 2090 2095	6288
aga aac ctg aag cac atc aat att gat caa ttt gta aga aaa tac aga Arg Asn Leu Lys His Ile Asn Ile Asp Gln Phe Val Arg Lys Tyr Arg 2100 2105 2110	6336
gca gcc ctg gga aaa ctc cca cag caa gct aat gat tat ctg aat tca Ala Ala Leu Gly Lys Leu Pro Gln Gln Ala Asn Asp Tyr Leu Asn Ser 2115 2120 2125	6384
ttc aat tgg gag aga caa gtt tca cat gcc aag gag aaa ctg act gct	6432

Phe Asn Trp Glu Arg Gln Val Ser His Ala Lys Glu Lys Leu Thr Ala			
2130	2135	2140	
ctc aca aaa aag tat aga att aca gaa aat gat ata caa att gca tta			6480
Leu Thr Lys Tyr Arg Ile Thr Glu Asn Asp Ile Gln Ile Ala Leu			
2145	2150	2155	2160
gat gat gcc aaa atc aac ttt aat gaa aaa cta tct caa ctg cag aca			6528
Asp Asp Ala Lys Ile Asn Phe Asn Glu Lys Leu Ser Gln Leu Gln Thr			
2165	2170	2175	
tat atg ata caa ttt gat cag tat att aaa gat agt tat gat tta cat			6576
Tyr Met Ile Gln Phe Asp Gln Tyr Ile Lys Asp Ser Tyr Asp Leu His			
2180	2185	2190	
gat ttg aaa ata gct att gct aat att att gat gaa atc att gaa aaa			6624
Asp Leu Lys Ile Ala Ile Ala Asn Ile Ile Asp Glu Ile Ile Glu Lys			
2195	2200	2205	
tta aaa agt ctt gat gag cac tat cat acc cgt gta aat tta gta aaa			6672
Leu Lys Ser Leu Asp Glu His Tyr His Thr Arg Val Asn Leu Val Lys			
2210	2215	2220	
aca atc cat gat cta cat ttg ttt att gaa aat att gat ttt aac aaa			6720
Thr Ile His Asp Leu His Leu Phe Ile Glu Asn Ile Asp Phe Asn Lys			
2225	2230	2235	2240
agt gga agt agt act gca tcc tgg att caa aat gtg gat act aag tac			6768
Ser Gly Ser Ser Thr Ala Ser Trp Ile Gln Asn Val Asp Thr Lys Tyr			
2245	2250	2255	
caa atc aga atc cag ata caa gaa aaa ctg cag cag ctt aag aga cac			6816
Gln Ile Arg Ile Gln Ile Gln Glu Lys Leu Gln Gln Leu Lys Arg His			
2260	2265	2270	
ata cag aat ata gac atc cag cac cta gct gga aag tta aaa caa cac			6864
Ile Gln Asn Ile Asp Ile Gln His Leu Ala Gly Lys Leu Lys Gln His			
2275	2280	2285	
att gag gct att gat gtt aga gtg ctt tta gat caa ttg gga act aca			6912
Ile Glu Ala Ile Asp Val Arg Val Leu Leu Asp Gln Leu Gly Thr Thr			
2290	2295	2300	
att tca ttt gaa aga ata aat gat gtt ctt gag cat gtc aaa cac ttt			6960
Ile Ser Phe Glu Arg Ile Asn Asp Val Leu Glu His Val Lys His Phe			
2305	2310	2315	2320
gtt ata aat ctt att ggg gat ttt gaa gta gct gag aaa atc aat gcc			7008
Val Ile Asn Leu Ile Gly Asp Phe Glu Val Ala Glu Lys Ile Asn Ala			
2325	2330	2335	
ttc aga gcc aaa gtc cat gag tta atc gag agg tat gaa gta gac caa			7056
Phe Arg Ala Lys Val His Glu Leu Ile Glu Arg Tyr Glu Val Asp Gln			
2340	2345	2350	
caa atc cag gtt tta atg gat aaa tta gta gag ttg gcc cac caa tac			7104
Gln Ile Gln Val Leu Met Asp Lys Leu Val Glu Leu Ala His Gln Tyr			
2355	2360	2365	
aag ttg aag gag act att cag aag cta agc aat gtc cta caa caa gtt			7152
Lys Leu Lys Glu Thr Ile Gln Lys Leu Ser Asn Val Leu Gln Gln Val			
2370	2375	2380	

aag ata aaa gat tac ttt gag aaa ttg gtt gga ttt att gat gat gct Lys Ile Lys Asp Tyr Phe Glu Lys Leu Val Gly Phe Ile Asp Asp Ala 2385 2390 2395 2400	7200
gtc aag aag ctt aat gaa tta tct ttt aaa aca ttc att gaa gat gtt Val Lys Lys Leu Asn Glu Leu Ser Phe Lys Thr Phe Ile Glu Asp Val 2405 2410 2415	7248
aac aaa ttc ctt gac atg ttg ata aag aaa tta aag tca ttt gat tac Asn Lys Phe Leu Asp Met Leu Ile Lys Lys Leu Lys Ser Phe Asp Tyr 2420 2425 2430	7296
cac cag ttt gta gat gaa acc aat gac aaa atc cgt gag gtg act cag His Gln Phe Val Asp Glu Thr Asn Asp Lys Ile Arg Glu Val Thr Gln 2435 2440 2445	7344
aga ctc aat ggt gaa att cag gct ctg gaa cta cca caa aaa gct gaa Arg Leu Asn Gly Glu Ile Gln Ala Leu Glu Leu Pro Gln Lys Ala Glu 2450 2455 2460	7392
gca tta aaa ctg ttt tta gag gaa acc aag gcc aca gtt gca gtg tat Ala Leu Lys Leu Phe Leu Glu Glu Thr Lys Ala Thr Val Ala Val Tyr 2465 2470 2475 2480	7440
ctg gaa agc cta cag gac acc aaa ata acc tta atc atc aat tgg tta Leu Glu Ser Leu Gln Asp Thr Lys Ile Thr Leu Ile Ile Asn Trp Leu 2485 2490 2495	7488
cag gag gct tta agt tca gca tct ttg gct cac atg aag gcc aaa ttc Gln Glu Ala Leu Ser Ser Ala Ser Leu Ala His Met Lys Ala Lys Phe 2500 2505 2510	7536
cga gag act cta gaa gat aca cga gac cga atg tat caa atg gac att Arg Glu Thr Leu Glu Asp Thr Arg Asp Arg Met Tyr Gln Met Asp Ile 2515 2520 2525	7584
cag gag gaa ctt caa cga tac ctg tct ctg gta ggc cag gtt tat agc Gln Gln Glu Leu Gln Arg Tyr Leu Ser Leu Val Gly Gln Val Tyr Ser 2530 2535 2540	7632
aca ctt gtc acc tac att tct gat tgg tgg act ctt gct gct aag aac Thr Leu Val Thr Tyr Ile Ser Asp Trp Trp Thr Leu Ala Ala Lys Asn 2545 2550 2555 2560	7680
ctt act gac ttt gca gag caa tat tct atc caa gat tgg gct aaa cgt Leu Thr Asp Phe Ala Glu Gln Tyr Ser Ile Gln Asp Trp Ala Lys Arg 2565 2570 2575	7728
atg aaa gca ttg gta gag caa ggg ttc act gtt cct gaa atc aag acc Met Lys Ala Leu Val Glu Gln Gly Phe Thr Val Pro Glu Ile Lys Thr 2580 2585 2590	7776
atc ctt ggg acc atg cct gcc ttt gaa gtc agt ctt cag gct ctt cag Ile Leu Gly Thr Met Pro Ala Phe Glu Val Ser Leu Gln Ala Leu Gln 2595 2600 2605	7824
aaa gct acc ttc cag aca cct gat ttt ata gtc ccc cta aca gat ttg Lys Ala Thr Phe Gln Thr Pro Asp Phe Ile Val Pro Leu Thr Asp Leu 2610 2615 2620	7872
agg att cca tca gtt cag ata aac ttc aaa gac tta aaa aat ata aaa	7920

Arg Ile Pro Ser Val Gln Ile Asn Phe Lys Asp Leu Lys Asn Ile Lys				
2625	2630	2635	2640	
atc cca tcc agg ttt tcc aca cca gaa ttt acc atc ctt aac acc acc ttc				7968
Ile Pro Ser Arg Phe Ser Thr Pro Glu Phe Thr Ile Leu Asn Thr Phe				
2645	2650	2655		
cac att cct tcc ttt aca att gac ttt gta gaa atg aaa gta aag atc				8016
His Ile Pro Ser Phe Thr Ile Asp Phe Val Glu Met Lys Val Lys Ile				
2660	2665	2670		
atc aga acc att gac cag atg ctg aac agt gag ctg cag tgg ccc gtt				8064
Ile Arg Thr Ile Asp Gln Met Leu Asn Ser Glu Leu Gln Trp Pro Val				
2675	2680	2685		
cca gat ata tat ctc agg gat ctg aag gtg gag gac att cct cta gcg				8112
Pro Asp Ile Tyr Leu Arg Asp Leu Lys Val Glu Asp Ile Pro Leu Ala				
2690	2695	2700		
aga atc acc ctg cca gac ttc cgt tta cca gaa atc gca att cca gaa				8160
Arg Ile Thr Leu Pro Asp Phe Arg Leu Pro Glu Ile Ala Ile Pro Glu				
2705	2710	2715	2720	
ttc ata atc cca act ctc aac ctt aat gat ttt caa gtt cct gac ctt				8208
Phe Ile Ile Pro Thr Leu Asn Leu Asn Asp Phe Gln Val Pro Asp Leu				
2725	2730	2735		
cac ata cca gaa ttc cag ctt ccc cac atc tca cac aca att gaa gta				8256
His Ile Pro Glu Phe Gln Leu Pro His Ile Ser His Thr Ile Glu Val				
2740	2745	2750		
cct act ttt ggc aag cta tac agt att ctg aaa atc caa tct cct ctt				8304
Pro Thr Phe Gly Lys Leu Tyr Ser Ile Leu Lys Ile Gln Ser Pro Leu				
2755	2760	2765		
ttc aca tta gat gca aat gct gac ata ggg aat gga acc acc tca gca				8352
Phe Thr Leu Asp Ala Asn Ala Asp Ile Gly Asn Gly Thr Thr Ser Ala				
2770	2775	2780		
aac gaa gca ggt atc gca gct tcc atc act gcc aaa gga gag tcc aaa				8400
Asn Glu Ala Gly Ile Ala Ala Ser Ile Thr Ala Lys Gly Glu Ser Lys				
2785	2790	2795	2800	
tta gaa gtt ctc aat ttt gat ttt caa gca aat gca caa ctc tca aac				8448
Leu Glu Val Leu Asn Phe Asp Phe Gln Ala Asn Ala Gln Leu Ser Asn				
2805	2810	2815		
cct aag att aat ccg ctg gct ctg aag gag tca gtg aag ttc tcc agc				8496
Pro Lys Ile Asn Pro Leu Ala Leu Lys Glu Ser Val Lys Phe Ser Ser				
2820	2825	2830		
aag tac ctg aga acg gag cat ggg agt gaa atg ctg ttt ttt gga aat				8544
Lys Tyr Leu Arg Thr Glu His Gly Ser Glu Met Leu Phe Phe Gly Asn				
2835	2840	2845		
gct att gag gga aaa tca aac aca gtg gca agt tta cac aca gaa aaa				8592
Ala Ile Glu Gly Lys Ser Asn Thr Val Ala Ser Leu His Thr Glu Lys				
2850	2855	2860		
aat aca ctg gag ctt agt aat gga gtg att gtc aag ata aac aat cag				8640
Asn Thr Leu Glu Leu Ser Asn Gly Val Ile Val Lys Ile Asn Asn Gln				
2865	2870	2875	2880	

ctt acc ctg gat agc aac act aaa tac ttc cac aaa ttg aac atc ccc Leu Thr Leu Asp Ser Asn Thr Lys Tyr Phe His Lys Leu Asn Ile Pro 2885	2890	2895	8688	
aaa ctg gac ttc tct agt cag gct gac ctg cgc aac gag atc aag aca Lys Leu Asp Phe Ser Ser Gln Ala Asp Leu Arg Asn Glu Ile Lys Thr 2900	2905	2910	8736	
ctg ttg aaa gct ggc cac ata gca tgg act tct tct gga aaa ggg tca Leu Leu Lys Ala Gly His Ile Ala Trp Thr Ser Ser Gly Lys Gly Ser 2915	2920	2925	8784	
tgg aaa tgg gcc tcg ccc aga ttc tca gat gag gga aca cat gaa tca Trp Lys Trp Ala Ser Pro Arg Phe Ser Asp Glu Gly Thr His Glu Ser 2930	2935	2940	8832	
caa att agt ttc acc ata gaa gga ccc ctc act tcc ttt gga ctg tcc Gln Ile Ser Phe Thr Ile Glu Gly Pro Leu Thr Ser Phe Gly Leu Ser 2945	2950	2955	2960	8880
aat aag atc aat agc aaa cac cta aga gta aac caa aac ttg gtt tat Asn Lys Ile Asn Ser Lys His Leu Arg Val Asn Gln Asn Leu Val Tyr 2965	2970	2975	8928	
gaa tct ggc tcc ctc aac ttt tct aaa ctt gaa att caa tca caa gtc Glu Ser Gly Ser Leu Asn Phe Ser Lys Leu Glu Ile Gln Ser Gln Val 2980	2985	2990	8976	
gat tcc cag cat gtg ggc cac agt gtt cta act gct aaa ggc atg gca Asp Ser Gln His Val Gly His Ser Val Leu Thr Ala Lys Gly Met Ala 2995	3000	3005	9024	
ctg ttt gga gaa ggg aag gca gag ttt act ggg agg cat gat gct cat Leu Phe Gly Glu Gly Lys Ala Glu Phe Thr Gly Arg His Asp Ala His 3010	3015	3020	9072	
tta aat gga aag gtt att gga act ttg aaa aat tct ctt ttc ttt tca Leu Asn Gly Lys Val Ile Gly Thr Leu Lys Asn Ser Leu Phe Phe Ser 3025	3030	3035	3040	9120
gcc cag cca ttt gag atc acg gca tcc aca aac aat gaa ggg aat ttg Ala Gln Pro Phe Glu Ile Thr Ala Ser Thr Asn Asn Glu Gly Asn Leu 3045	3050	3055	9168	
aaa gtt cgt ttt cca tta agg tta aca ggg aag aat gac ttc ctg aat Lys Val Arg Phe Pro Leu Arg Leu Thr Gly Lys Ile Asp Phe Leu Asn 3060	3065	3070	9216	
aac tat gca ctg ttt ctg agt ccc agt gcc cag caa gca agt tgg caa Asn Tyr Ala Leu Phe Leu Ser Pro Ser Ala Gln Gln Ala Ser Trp Gln 3075	3080	3085	9264	
gta agt gct agg ttc aat cag tat aag tac aac caa aat ttc tct gct Val Ser Ala Arg Phe Asn Gln Tyr Lys Tyr Asn Gln Asn Phe Ser Ala 3090	3095	3100	9312	
gga aac aac gag aac att atg gag gcc cat gta gga ata aat gga gaa Gly Asn Asn Glu Asn Ile Met Glu Ala His Val Gly Ile Asn Gly Glu 3105	3110	3115	3120	9360
gca aat ctg gat ttc tta aac att cct tta aca att cct gaa atg cgt			9408	

Ala Asn Leu Asp Phe Leu Asn Ile Pro Leu Thr Ile Pro Glu Met Arg			
3125	3130	3135	
ctc cct tac aca ata atc aca act cct cca ctg aaa gat ttc tct cta			9456
Leu Pro Tyr Thr Ile Ile Thr Thr Pro Pro Leu Lys Asp Phe Ser Leu			
3140	3145	3150	
tgg gaa aaa aca ggc ttg aag gaa ttc ttg aaa acg aca aag caa tca			9504
Trp Glu Lys Thr Gly Leu Lys Glu Phe Leu Lys Thr Lys Gln Ser			
3155	3160	3165	
ttt gat tta agt gta aaa gct cag tat aag aaa aac aaa cac agg cat			9552
Phe Asp Leu Ser Val Lys Ala Gln Tyr Lys Lys Asn Lys His Arg His			
3170	3175	3180	
tcc atc aca aat cct ttg gct gtg ctt tgt gag ttt atc agt cag agc			9600
Ser Ile Thr Asn Pro Leu Ala Val Leu Cys Glu Phe Ile Ser Gln Ser			
3185	3190	3195	3200
atc aaa tcc ttt gac agg cat ttt gaa aaa aac aga aac aat gca tta			9648
Ile Lys Ser Phe Asp Arg His Phe Glu Lys Asn Arg Asn Asn Ala Leu			
3205	3210	3215	
gat ttt gtc acc aaa tcc tat aat gaa aca aaa att aag ttt gat aag			9696
Asp Phe Val Thr Lys Ser Tyr Asn Glu Thr Lys Ile Lys Phe Asp Lys			
3220	3225	3230	
tac aaa gct gaa aaa tct cac gac gag ctc ccc agg acc ttt caa att			9744
Tyr Lys Ala Glu Lys Ser His Asp Glu Leu Pro Arg Thr Phe Gln Ile			
3235	3240	3245	
cct gga tac act gtt cca gtt gtc aat gtt gaa gtg tct cca ttc acc			9792
Pro Gly Tyr Thr Val Pro Val Val Asn Val Glu Val Ser Pro Phe Thr			
3250	3255	3260	
ata gag atg tcg gca ttc ggc tat gtg ttc cca aaa gca gtc agc atg			9840
Ile Glu Met Ser Ala Phe Gly Tyr Val Phe Pro Lys Ala Val Ser Met			
3265	3270	3275	3280
cct agt ttc tcc atc ata ggt tct gac gtc cgt gtg cct tca tac aca			9888
Pro Ser Phe Ser Ile Ile Gly Ser Asp Val Arg Val Pro Ser Tyr Thr			
3285	3290	3295	
tta atc ctg cca tca tta gag ctg cca gtc ctt cat gtc cct aga aat			9936
Leu Ile Leu Pro Ser Leu Glu Leu Pro Val Leu His Val Pro Arg Asn			
3300	3305	3310	
ctc aag ctt tct ctt cca gat ttc aag gaa ttg tgt acc ata agc cat			9984
Leu Lys Leu Ser Leu Pro Asp Phe Lys Glu Leu Cys Thr Ile Ser His			
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Ile Phe Ile Pro Ala Met Gly Asn Ile Thr Tyr Asp Phe Ser Phe Lys			
3330	3335	3340	
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Ser Ser Val Ile Thr Leu Asn Thr Asn Ala Glu Leu Phe Asn Gln Ser			
3345	3350	3355	3360
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Asp Ile Val Ala His Leu Leu Ser Ser Ser Ser Val Ile Asp Ala			

3365	3370	3375	
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ttg aag tta gcc aca gct ctg tct ctg agc aac aaa ttt gtg gag ggt Leu Lys Leu Ala Thr Ala Leu Ser Leu Ser Asn Lys Phe Val Glu Gly 3395	3400	3405	10224
agt cat aac agt act gtg agc tta acc acg aaa aat atg gaa gtg tca Ser His Asn Ser Thr Val Ser Leu Thr Thr Lys Asn Met Glu Val Ser 3410	3415	3420	10272
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tcc atg gaa ttt aag tat gat ttc aat tct tca atg ctg tac tct acc Ser Met Glu Phe Lys Tyr Asp Phe Asn Ser Ser Met Leu Tyr Ser Thr 3460	3465	3470	10416
gct aaa gga gca gtt gac cac aag ctt agc ttg gaa agc ctc acc tct Ala Lys Gly Ala Val Asp His Lys Leu Ser Leu Glu Ser Leu Thr Ser 3475	3480	3485	10464
tac ttt tcc att gag tca tct acc aaa gga gat gtc aag ggt tcg gtt Tyr Phe Ser Ile Glu Ser Ser Thr Lys Gly Asp Val Lys Gly Ser Val 3490	3495	3500	10512
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ttg aat tcc aag agc aca cgg tct tca gtg aag ctg cag ggc act tcc Leu Asn Ser Lys Ser Thr Arg Ser Ser Val Lys Leu Gln Gly Thr Ser 3525	3530	3535	10608
aaa att gat gat atc tgg aac ctt gaa gta aaa gaa aat ttt gct gga Lys Ile Asp Asp Ile Trp Asn Leu Glu Val Lys Glu Asn Phe Ala Gly 3540	3545	3550	10656
gaa gcc aca ctccaa cgc ata tat tcc ctc tgg gag cac agt acg aaa Glu Ala Thr Leu Gln Arg Ile Tyr Ser Leu Trp Glu His Ser Thr Lys 3555	3560	3565	10704
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agc aaa gcc acc ctg gaa ctc tct cca tgg caa atg tca gct ctt gtt Ser Lys Ala Thr Leu Glu Leu Ser Pro Trp Gln Met Ser Ala Leu Val 3585	3590	3595	10800
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Gly Gln Glu Val Ala Leu Asn Ala Asn Thr Lys Asn Gln Lys Ile Arg			
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Trp Lys Asn Glu Val Arg Ile His Ser Gly Ser Phe Gln Ser Gln Val			
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Glu Leu Ser Asn Asp Gln Glu Lys Ala His Leu Asp Ile Ala Gly Ser			
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Asp Lys Ser Leu Trp Asp Phe Leu Lys Leu Asp Val Thr Thr Ser Ile			
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Gly Arg Arg Gln His Leu Arg Val Ser Thr Ala Phe Val Tyr Thr Lys			
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Asn Pro Asn Gly Tyr Ser Phe Ser Ile Pro Val Lys Val Leu Ala Asp			
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Val Met Pro Thr Phe His Val Pro Phe Thr Asp Leu Gln Val Pro Ser			
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Cys Lys Leu Asp Phe Arg Glu Ile Gln Ile Tyr Lys Lys Leu Arg Thr			
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Ser Ser Phe Ala Leu Thr Leu Pro Thr Leu Pro Glu Val Lys Phe Pro			
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Glu Val Asp Val Leu Thr Lys Tyr Ser Gln Pro Glu Asp Ser Leu Ile			
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Pro Phe Phe Glu Ile Thr Val Pro Glu Ser Gln Leu Thr Val Ser Gln			
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Val Pro Glu Gln Thr Ile Glu Ile Pro Ser Ile Lys Phe Ser Val Pro			

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Arg Phe Gln Lys Ala Ala Ser Gly Thr Thr Gly Thr Tyr Gln Glu Trp			
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Gln Ala Ser Phe Gln Gly Leu Lys Asp Asn Val Phe Asp Gly Leu Val			
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Arg Val Thr Gln Lys Phe His Met Lys Val Lys Leu Ile Asp Ser			
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Leu Ile Asp Phe Leu Asn Phe Pro Arg Phe Gln Phe Pro Gly Lys Pro			
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Gly Ile Tyr Thr Arg Glu Glu Leu Cys Thr Met Phe Met Arg Glu Val			
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Ile Leu Phe Ser Tyr Phe Gln Asp Leu Val Ile Thr Leu Pro Phe Glu			
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Ser Leu Lys Thr Thr Glu Val Leu Arg Asn Leu Gln Asp Leu Leu Gln			
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Phe Ile Phe Gln Leu Ile Glu Asp Asn Ile Lys Gln Leu Lys Glu Met			
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Lys Phe Thr Tyr Leu Ile Asn Tyr Ile Gln Asp Glu Ile Asn Thr Ile			
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Phe Asn Asp Tyr Ile Pro Tyr Val Phe Lys Leu Leu Lys Glu Asn Leu			
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Cys Leu Asn Leu His Lys Phe Asn Glu Phe Ile Gln Asn Glu Leu Gln			

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gcagaacctc tggcattcac tttctctcat gattacaaag gctccacgag tcatacatctc 420  
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